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REVISION OF THE DONACIÆ OF BOREAL AMERICA.

BY CHARLES W. LENG, B. S.

Donacia was established by Fabricius, in 1775, for a European species allied to our *subtilis*, and the name, derived from the Greek *donax*—a reed,—is indicative of the habits of that and the other species comprised; all are subaquatic, the larvæ feeding in, the imagines being found about reeds, pond lilies, *Sagittaria* and other water plants. The earliest descriptions of our species are by foreign authors, Ahrens and Kunze, in 1810 and 1818 respectively. Thomas Say described five in 1823 and 1827, Newman added others, and Kirby still more. In 1845 there was published a "Monographie" by Lacordaire, which swelled the number considerably. In 1851, Dr. LeConte reviewed the described species, noting many synonyms, and in 1873 Crotch made a Synopsis, on which the names now in use are based. In all, about 70 names have been proposed, and over 100 pages printed in descriptions.

Some confusion still existing, I have attempted in the following pages to give the characters by which the really distinct species may be recognized. Unassisted, this would have been both presumptuous and impossible; but in advice and material I have received so much help, that I hope the result may be found satisfactory. To Dr. Geo. H. Horn I owe the free use of a collection representing all the described species, each one specially compared with the types of Dr. LeConte's species in the Cambridge Museum; as well as the results of his observations on the genus for many years back. Through the favor of Prof. C. V. Riley, I have been entrusted with the collection of the National Museum. To Mr. Frederick Blanchard I owe many valuable suggestions and sets of the species living on the Concord River. To Messrs. Roberts, Liebeck, Westcott, Wickham, Hulbert and Sherman, my thanks are due for specimens. Finally, my friends on Staten Island, William T. Davis and J. C. Thompson, have freely given me the use of their collections and time.

Before using the synopsis, the reader should observe the following explanation of the terms employed.

"Elytra truncate at tip, or subtruncate." Under this head are included all the forms that are in the least truncate, or even doubt-

fully so, and the only form excluded is that in which the tip is evidently rounded. In such the sutural margin is sinuate.

"Mesosternum narrower than the coxa." By this is meant that the portion of the under surface seen between the middle coxæ is narrower than those coxæ separately. It is used as a convenient measure of the width of the insect, being narrowest in the conspicuously slender species, and may be inferred where it is difficult to see, as when the insect is pasted on a point.

"Sutural margin sinuate posteriorly." In many Donaciæ the elytra are declivous at the apex; the elytra are closely joined at the suture in repose, but the margins on the declivous portion appear double, and although they truly meet, there is a second apparent margin within the true one. This second margin, starting not more than one-fourth the length from the tip—often less—is sinuate, or curved more or less, away from the suture. Thus a space somewhat elliptical in shape is formed, sometimes depressed, sometimes in the same plane with the rest of the elytron, and always destitute of punctuation. This sinuation might also be described as a sinuate displacement of the sutural stria.

"Posterior femora elliptical." In all Donaciæ but *rufa*, the posterior femora are decidedly pedunculate. In that species the neck is not evident, and I have followed Dr. LeConte's use of the term elliptical to describe them, though they are actually much broader at the apex.

Certain characters are subject to great individual variation. These are the color, the relative length of the antennal joints, the number and size of the femoral teeth or spines, and the punctuation and sculpture of the upper surface. While differences in these respects are, to an extent, indicative of specific rank, it is important that they be not carried too far, and I have endeavored to mark their limits in the descriptions which follow the synopsis.

The dilation or extension into spinous processes of the tibiæ is very evident in some species. In *piscatrix* and *palmata* this is especially true of the middle tibiæ, and a spinule may also be seen beneath the dilation. In certain of the convex species the dilation is more apparent on the front tibiæ. The character, however, varies greatly in individuals of the same species, and I have not made use of it in the synopsis.

The sexes in most Donaciæ are widely differentiated. As a rule the females are broader, the posterior femora are either without or

with fewer and weaker spines than the male, and the last dorsal segment is rounded at apex and more or less elongate. The males besides being narrower and more strongly armed on the femora, have the pygidium shorter and either truncate, arcuately emarginate, or acutely triangularly emarginate, but never rounded. The males of *palmata* have the anterior tarsi dilated, and the same sex of *piscatrix* has the first ventral segment excavated.

All the species of *Donacia* are subaquatic in habit, frequenting either the pond lilies, on the broad leaves of which they may be seen from April to September, or the rushes and sedges that grow in damp places.

In the following synoptic table several new names will be noted; these are:

cincticornis Newn., which was formerly called *lucida* Lac., or in the check lists *rugifrons* Newn.

pusilla Say, which antedates and replaces *cuprea* Ky.

rufa Say, which antedates and replaces *Kirbyi* Lac.

The scheme proposed is as follows:

Head and thorax evidently pubescent above.....Group A.

Head occasionally, thorax never pubescent.

Elytra truncate at tip, or subtruncate.

Form decidedly flattened; mesosternum about as broad as each coxa.

Group B.

Form more convex; mesosternum narrower than the coxa.....Group C.

Elytra rounded at tip, the sutural margin sinuate posteriorly; form convex;

mesosternum narrowGroup D.

Group A.

Three species fall into this group which are not otherwise at all similar. It will be noted that *pubescens* is the only species with pubescent elytra, and *pubicollis* the only one with the femora destitute of teeth or spines in both sexes. A badly rubbed specimen of *hirticollis* might be placed in the next group, from all the species of which it may be distinguished by the very small tooth of the femora, which is often reduced to a mere lump. The species are separated thus:

Elytra without pubescence; posterior femora with a small tooth...**hirticollis**.

Elytra without pubescence; posterior femora simple.....**pubicollis**.

Elytra evidently pubescent; posterior femora toothed**pubescens**.

Group B.

The species comprised in this group are similar in appearance, all being evidently flattened above; the first ventral segment is not only flattened, but longer than all the others combined; the color is frequently testaceous; the middle tibiæ are expanded at tip and are armed beneath with a spinule; the mesosternum is conspicuously broad in all except *piscatrix* male. These are the species which frequent the pond lilies, and Mr. Blanchard has suggested that their great breadth of beam indicates an adaptation to their particularly aquatic existence, in which connection it is worthy of note that the pubescence of the under surface, characteristic of the tribe, is in them especially developed. The species are:

Thorax narrowed in front; posterior femora pluridentate male, simple female.

floridæ.

Thorax quadrate, or wider in front; posterior femora dentate in both sexes, the male often bi- or tridentate.

Antennæ with second and third joints nearly equal..... **cincticornis.**

Antennæ with third joint much longer than second.

Elytra truncate.

Anterior tarsi of male dilated..... **palmata.**

Anterior tarsi simple..... **hypoleuca.**

Elytra subtruncate, form more convex; first ventral segment of ♂ excavated..... **piscatrix.**

The specimens which I include under the name *cincticornis* may be divided into three species or varieties or races as follows:

Prothorax not coarsely punctate.

Posterior femora male very large and strongly dentate, posterior tibiæ curved and serrate..... *lucida.*

Posterior femora less developed..... unnamed.

Prothorax punctate at base and apex only; posterior femora less developed, tibiæ straight, or nearly so..... *proxima.*

Prothorax coarsely punctate over its entire surface; femora and tibiæ as in preceding..... *magnifica.*

From the number of specimens before me, showing all gradations in the thoracic sculpture and femoral armature, I do not think these forms can be recognized as species, and I suggest that they be placed in our lists as varieties.

Group C.

This group includes *subtilis*, of which the female might, with equal propriety, be placed in the preceding group, though the male is decidedly more convex; and several species which, by their convex form, are associated with the last group, but differ in the truncate

elytral tip. Two species, *Harrisii* and *distincta*, present also the peculiar sinuation of the sutural margin of the elytra which characterizes that group. This consists in the displacement of the margin for a space equal to one-fourth the length of the elytron, whereby, when the elytra are closed in repose, an elliptical space is formed bounded by the displaced margins. In *Harrisii* the margin appears double, and the inner sinuate portion is in a higher plane than the outer straight portion. In most of the species the material which fills the sinuation is in the same plane.

Eyes of normal size; sutural margin of elytra straight, except in *distincta*.

Thorax punctate, not or scarcely tuberculate.

Thoracic punctures coarse, uniform.....**subtilis.**

Thoracic punctures uneven, finer punctures mixed through the coarser.

porosicollis.

Thorax uneven on the disc, tuberculate on the sides.

Sutural margin of elytra straight.

Elytra with two transverse indentations.....**æqualis.**

Elytra not indented; posterior femora male dentate, female simple.

tuberculata.

Sutural margin of elytra sinuate.....**distincta.**

Eyes small; thorax tuberculate; sutural margin of elytra sinuate....**Harrisii.**

Of these species, *porosicollis* seems rare; the specimens I have are far more slender than any other, and there is an appearance of an abrupt demarkation on the sides of the elytra. Inasmuch as *subtilis*, its nearest ally, is constant in the style of its punctuation, I have preferred to use that character for the separation of the two species. The specimens under *subtilis* may be separated thus:

Thorax straight on the sides; second and third antennal joints subequal...*subtilis*.

Thorax constricted at middle; third joint of antennæ longer than second...*rugosa*.

but on account of the variations observed in these characters in other species, I doubt *rugosa* being a distinct species; *torosa* Lec. is included with *distincta*.

Group D.

The species here included are readily distinguished by the convex form, rounded elytra and sinuate sutural margin. They may be separated as follows:

Thorax depressed without basal and medial groove.

Posterior femora dentate in both sexes.....**pusilla.**

Posterior femora dentate in male only.....**femoralis.**

Thorax convex, punctured, and with an evident basal and more or less evident medial groove.

Posterior femora pedunculate; thorax closely punctulate.

Legs dark; posterior femora dentate in both sexes.....**emarginata.**

Legs dark; posterior femora dentate in male only.....**metallica.**

Legs rufo-testaceous; posterior femora dentate in both sexes.....**flavipes.**

Posterior femora elliptical; dentate in both sexes; thorax sparsely punctured;
legs rufo-testaceous **rufa.**

The species contained in this group may be arranged in pairs as placed above; the differences, however, between *pusilla* and *femoralis*, *emarginata* and *metallica*, and *flavipes* and *rufa*, are feeble. The first pair are readily isolated by the depressed thorax, the second by the dark legs, the third by the yellow legs and more convex thorax. It must be observed that the femoral tooth is less developed in the females throughout the genus, and is particularly weak in this group; femora are subject to some variation in form and the punctuation is inconstant in many of the preceding species, so that, while the considerable number of specimens before me are separable by the characters given, the reader must be prepared to find some which, in these respects, will vary from the typical form.

Descriptions and Notes.

In the following pages I propose to copy either the original description, or that of Dr. LeConte's paper, supplementing each with descriptions of those parts especially useful in recognizing the species and stating the sexual differences and the variations I have observed. The bibliography and synonymy is placed at the end.

D. hirticollis Kirby. Original description.

"Downy satiny underneath and silvery, elytra naked, black with the punctures of the rows green gilt; posterior thighs unidentate. Length 3.5 lines. A single specimen taken in lat. 65°.

"Body underneath covered with a thick coat of decumbent pile resembling satin and shining like silver. Head hoary from inconspicuous hairs, most minutely and confluent punctured with a slight interocular channel with an obtuse ridge on each side; antennæ with the second and third joints equal in length, auburn glittering with silver pile; prothorax longer than wide, hoary from inconspicuous down, most minutely and confluent punctured, channeled, sides subimpressed, anterior tubercles flat; scutellum large, levigated; elytra black, punctured in rows, whose interstices are wrinkled; posterior thighs with a single short obtusangular tooth. This pretty species comes near *bidens* Oliv., which I always find on *Potamogeton natans*, but it is sufficiently distinguished by its black thorax hoary from down and legs without any red."

Mesosternum narrower than the coxa; *first ventral segment* about equal to the metasternum; *form* moderately flattened above and beneath; *third joint of antennæ* equal to or slightly longer than the second.

The *males* are narrower, have the tooth of posterior femora larger and more acute, and the pygidium truncate or barely arcuately emarginate. The *females* are broader, the femoral tooth is feeble or reduced to an almost imperceptible lump, and the pygidium is rounded, not at all emarginate.

The twenty-five specimens before me vary in size; in color, two having the elytra yellow; in the sharpness of the truncation of the elytra, the outer angle being indistinct in some.

Length 9—11 mm.; .36—.44 inch. *Habitat*.—Cal., Wash., Can., Lake Superior, Hud. Bay Terr., N. Y.

Food-plant unknown.

D. pubicollis Suffrian. Crotch's description.

"Narrow, elongate æneous; legs pale red, under surface silvery; head, thorax and scutellum cinereous, pubescent; eyes prominent; thorax longer than broad, callus not well marked, surface punctulate; elytra closely striate punctate, apex rounded, interstices rugulose; tibiæ carinate externally, apex not produced. L. .42. Illinois. Very distinct by the rounded elytra, simple femora, and pubescent thorax."

Mesosternum narrower than the coxa; *first ventral segment* longer than the metasternum; *third joint of antennæ* much longer than the second. The *form* is convex above and but little flattened beneath.

The sexes do not differ.

About twenty specimens in different collections present no variations.

Length 10—11 mm.; .40—.44 inch. *Habitat*.—Illinois.

Food-plant, *Nymphæa*. This species seems to be comparatively rare, and is curiously local, every specimen being labeled Illinois, or N. Illinois.

D. pubescens LeConte. Original description translated.

"Elongate, ferruginous, densely clothed above with sericeous golden hair; thorax quadrate, slightly constricted on each side at middle, broadly channeled above, vaguely impressed before and behind, tubercles broad, but little prominent; elytra with the disc depressed, the sides suddenly declivous, towards the suture tri-impressed, apex subtruncate, striæ strongly punctate, interstices almost flat; posterior femora edentate. Length 9 mm."

Mesosternum narrower than the coxa; *first ventral segment* longer than the metasternum; *third joint of antennæ* longer than second.

The *males* are narrower than the females, and have the pygidium short and broadly rounded, nearly truncate; the *female* pygidium is elongate, rounded at tip.

Three specimens only, present no variations.

Length 7—9 mm.; .28—.36 inch. *Habitat*.—Can., Ill., Mich.

D. floridæ n. sp.

Form flattened; thorax narrowed in front; elytra truncate at apex, outer angle spiniform; posterior femora pluridentate male, not dentate female; body pubescent beneath only, color in the three specimens before me testaceous, with metallic gloss; the third joint of antennæ twice as long as second; mesosternum as wide as coxa; first ventral segment longer than metasternum.

Male.—Pygidium short, broadly rounded; posterior femora strongly incrassate with three distinct teeth, of which the middle one is much longer and sharper.

Female.—Pygidium elongate, rounded at apex; posterior femora feebly incrassate, not dentate.

Length 7 mm.; .28 inch. *Habitat*.—Florida.

I cannot find any description agreeing with the characters of this insect. It looks like a small *lucida*, but differs not only in the simple femora of the female, but in the form of the thorax. I have seen only three specimens, in the National Museum.

D. cincticornis Newman. Original description translated.

"Antennæ elongate, the basal joint pale, the apical black; vertex shining; prothorax quadrate, most minutely punctured, with an impressed dorsal line; head and prothorax black æneous, elytra testaceous, shining; elytral apex truncate; metafemora elongate, incrassate, bidentate; legs testaceous, femora with two black vittæ. [Corp. long. .325 unc., lat. .1 unc.]

This species has been long known as *lucida* Lac. The synonymy was pointed out by Dr. Horn some time ago, [Ent. Am. I, p. 9] but has not been corrected in the Check List. Lacordaire's description of *lucida* is as follows:

"Moderately elongate, above metallic green, very shining, elytra rufescent; beneath densely cinereo-sericeous; antennæ and legs rufous, maculate with black; prothorax transverse, slightly narrowed behind, the angles obtuse but distinct, the margin in front and at the middle of the base, reflexed; towards the front on each side obsoletely tuberculate; above vaguely rugose, with a dorsal sulcus abbreviated behind and an impressed puncture; elytra flattened on the disc, declivous at apex, which is squarely truncate; bi-impressed, punctato-striate, interstices flat, vaguely transversely rugose. Length $3\frac{3}{4}$ — $4\frac{1}{2}$ lines; width $1\frac{1}{4}$ — $1\frac{3}{4}$ lines."

Mesosternum as broad as the coxa; *first ventral segment* longer than the *metasternum*; *third joint of antennæ* about equal to the second; *posterior femora* incrassate and dentate.

Male.—Pygidium truncate; posterior femora strongly incrassate and sharply dentate, or even tridentate.

Female.—Pygidium elongate and rounded at apex; posterior femora feebly incrassate and unidentate.

The posterior tibiæ are serrate in well developed specimens ♂.

Length 7—11 mm.; .28—.44 inch. *Habitat*.—Can., Mich., N. Ill., N. H., N. Y., Mass., Texas, Vt.

This is an abundant and very variable species; it is the species called *rugifrons* Newm. in many collections, which name was applied

to an entirely different insect belonging to the last group. The variations observed are in size, as indicated above; in color, which may be a uniform greenish black, or a much lighter color almost testaceous, or a combination of both; in the femoral teeth, which depend in number and size upon the development of the insect, and may be traced through gradually weakening forms, from three prominent spines in the male to a single obtuse tooth in the female; and in the relative length of the antennal joints, the third being usually as short as the second, but sometimes evidently longer. It is never twice as long, however, as in the following species. Although selected specimens can be made to look very different, I can find no character in these variations to base even a variety.

With the punctuation of the thorax, it is somewhat different. Intermediate specimens do occur, and indicate the close relation between *cincticornis* and its varieties *proxima* and *magnifica*, but the greater number are readily separated, as indicated in the synopsis.

Food-plant is undoubtedly the pond lily, *Nuphar advena*. I have always found the insect on this plant, frequently within its yellow flowers, and Mr. Roberts has also in Vermont, and Mr. Blanchard in Massachusetts. Furthermore, it does not occur in localities where there are no lily ponds. The white water lily, *Nymphæa odorata*, occurs in many ponds with the *Nuphar*, and the insects show no partiality for it in the imago stage. The original descriptions of the varieties are:

Var. **proxima** Kirby.—“Thighs bidentate, with one tooth minute; above dark violet glossy, head rather bronzed; punctures of the elytra green gilt; body underneath covered with a satin silver pile. Length 5 lines. Taken in Canada by Dr. Bigsby. Body a little flattened, covered underneath with a dense coat of glittering silver pile resembling satin. Head a little bronzed, channeled between the eyes, minutely punctured, palpi testaceous; antennæ entirely black; prothorax in the disc dark violet and channeled, sides bronzed and impressed, anterior tubercles not prominent; scutellum bronzed; elytra nearly black, with a slight tint of violet, punctures green gilt, interstices of the rows not wrinkled, an anterior impression near the suture, rounded at the apex; posterior legs long, with the thighs somewhat curved, attenuated at the base, curved at the apex, with two teeth placed consecutively, the first long, slender and acute; the last wide, short and denticulated posteriorly. This species is nearly related to *crassipes* Fab., but the antennæ and legs are entirely black, and the teeth on the posterior thighs are not equal.”

Length 8—11 mm.; .32—-.44 inch. *Habitat*.—Cal., Idaho, Hud. Bay Terr., Can., N. H., Mass., N. Y., Pa., Wis.

Abundant, over forty specimens before me, none of which are testaceous in color.

Var. **magnifica** Lec.—“Elytra depressed, triangular, truncate; orbits of the eyes prominent; form broad, depressed; second and third joints of antennæ subequal; elytra deeply striate; tooth of the posterior femora emarginate or crenate; splendid violaceous, margined with gold; thorax quadrate, channeled, punctate; posterior legs large, tibiæ incurved. Length .34 inch. Lake Superior. Male, posterior femora bidentate, tibiæ serrate beneath. Female, posterior femora unidentate, tibiæ not serrate.”

Length 8--9 mm.; .32--.36 inch. *Habitat*.—Hud. Bay, Can., Mich., D. C.?

Rare, only seven specimen examined.

D. hypoleuca Lacordaire. Original description translated.

“Elongate, rufescent-metallic, the surface shining and golden near the margins; beneath silvery sericeous; antennæ and legs concolorous, the posterior femora infusate above; prothorax subquadrate, base sinuate, slightly constricted at middle, scarcely tuberculate on the sides in front, a narrow dorsal channel terminating in a transverse basal sulcus; elytra moderately attenuate at apex, which is squarely truncate, surface flat, feebly punctato-striate, the three external interstices very slightly transversely rugose, the others almost smooth. Length $4\frac{1}{2}$ lines; width $1\frac{3}{4}$ lines.”

Mesosternum as broad as the coxa; *first ventral segment* about as long as the metasternum; *third joint of antennæ* twice as long as the second; *form* broad and flattened; *thorax* not evidently punctate.

Male, pygidium truncate; *female*, moderately elongate, rounded at apex. Both sexes have the *posterior femora* unidentate, the female more feebly.

Length 10 mm.; .40 inch. *Habitat*.—Tex., La., Fla.

Eight specimens are before me, of which two are greenish black above; *texana* Crotch is the female.

Var. **rufescens** Lacordaire, is smaller, and has the antennal joints very moderately thickened externally. It occurs near Lowell, Mass., on the lily “pads,” and I am indebted to Mr. Blanchard for my specimens as well as for pointing out its differentiation. It is also found in New York by Mr. Sherman, and in New Jersey by Mr. Liebeck, and is possibly mixed in collections with *cineticornis*, from which it may be separated by the length of the third antennal joint.

Length 7--8 mm.; .32 inch. *Habitat*.—Mass., N. Y., N. J.

D. palmata Olivier. Original description translated.

“Green metallic above, cinereous beneath; anterior tarsi dilated; of the same size as *D. simplex*; antennæ almost as long as the body, basal joints rufous, apical black; elytra punctato-striate; legs red, posterior femora metallic above, dentate beneath; anterior tarsi dilated, the first joint large, cordiform.” [The dilated tarsi are present in the male only.]

Mesosternum as broad as the coxa; *first ventral* as long as the metasternum; *elytra* truncate at tip; *form* flattened, more slender than the preceding species; *third joint of antennæ* more than twice as long as second; *thorax* scarcely punctulate.

Male, pygidium truncate; *female*, very elongate, rounded at tip; *posterior femora* dentate in both sexes, often bidentate in male.

Length 9—11 mm.; .36—.44 inch. *Habitat*.—Pa., N. J., N. Y., Mass., Can., Mich., Wis.

Abundant on the pond lilies. The color is often testaceous.

D. piscatrix Lacordaire Original description translated.

"Pale rufous, opaque; chest and head blackish; beneath cinereo-sericeous. Prothorax subtransverse, somewhat narrowed at base, anterior angles obsolete, the posterior distinct; bituberculate on each side, smooth above, impressed at base; the dorsal channel narrow, subobsolete. Elytra subparallel, apex declivous, broadly squarely truncate; disc flat, vaguely bi-impressed, punctato-striate; the interstices slightly convex, subporcated, on all sides very slightly coriaceous. Length $4\frac{1}{2}$ lines; width $1\frac{3}{4}$ lines."

Mesosternum as broad as the coxa female, narrower male; *first ventral segment* about as long as the metasternum; *elytral tip* subtruncate, not so squarely terminated as in the preceding; *form* more convex, making an approach to the convex forms of following groups; *antennæ* comparatively shorter and slightly stouter; *femora* dentate, middle tibiæ unsymmetrically dilated at tip.

Male, pygidium subtruncate; posterior femora strongly dentate or bidentate; first ventral segment excavated at middle, *i.e.*, there is a depressed pit, such as the point of a dull pencil might have formed.

Female, pygidium elongate, rounded at tip; posterior femora unidentate, first ventral not excavated.

Varies in color from the typical "pale rufous" to a dark bronze just as the preceding species do; *alutacea* Lec. is the name applied to the darker forms in many collections, but it is impossible to draw any line between them. The intermediate forms are among the most beautiful specimens in the genus, the suture being broadly bronzed and the other part of the elytra golden testaceous.

This species occurs with the preceding on the leaves and in the flowers of *Nuphar*, and I have taken it on the roots of that plant, where it pupates, enclosed in an oval cocoon of leathery consistency. It is mixed in most collections with *palmata*, and the females are not readily separated.

Length 6.5—10 mm.; .26—.40 inch. *Habitat*.—Cal., Wis., Ill., N. Y., Ga., Fla., Texas. Abundant.

D. subtilis Kunze. Dr. LeConte's description translated.

"Depressed, elongate brassy; thorax densely rugosely punctate, quadrate, a little longer than wide, scarcely narrowed behind, angles prominent; more or less channelled, sides almost straight, scarcely impressed. Elytra tri-impressed, interstices flat; transversely densely rugose. Antennæ with third joint about one and a half times as long as second. Posterior femora less elongate, strongly clavate, armed beneath with an acute tooth. Length .27—.28. N. Y. and Pa. Varies cupreous metallic; varies also by the elytra being not impressed. Smaller specimens have the thorax deeply impressed."

Mesosternum narrower than the coxa, but wider in the female; *first ventral segment* longer than the metasternum; *tip of elytra* truncate, *form* broader in

the female than in the male, and more elongate and less flattened than in the preceding group.

Male, pygidium truncate; *female*, pygidium obtusely rounded, form broader. The sexes are feebly differentiated in this.

Length 7—10 mm. : .28—.40 inch. *Habitat*.—Dakota, Wis., Can., N. Ill., Iowa, Col., Ohio, Pa., N. Y., Mass., N. H.

This species is very abundant on Staten Island at a pond bordered by marshy ground, where grow a number of sedges and grasses, on which the insects principally occur. They wander to the lily pads, but do not occur in ponds where the lilies alone are abundant. I therefore conclude that they live on these sedges. Mr. Clarence M. Weed has noted their abundance in a similar situation in Ohio (Bull. Ohio Ex. Station, 1889).

Var. **rugosa** Lec.—Differs only as stated in the synopsis. The specimens I have seen are from Lowell, Mass., collected by Mr. Blanchard, who has pointed out to me, very kindly, the character by which they may be separated.

D. porosicollis Lacordaire. Original description translated.

"Elongate, silvery sericeous beneath, above æneous; antennæ rufescent, legs variegated rufous and æneous. Prothorax quadrate, somewhat narrowed behind, the angles scarcely distinct; the disc rather flat, the sides deflexed, the entire surface finely strigose and cribrately impressed with minute punctures, the dorsal channel very narrow, entire. Elytra longer, apex scarcely declivous, moderately attenuate, and squarely truncate, finely punctato-striate, interstices very slightly though closely transversely strigose. Posterior femora armed beneath with a subobsolete tooth near the apex. Length $4\frac{2}{3}$ lines; width $1\frac{1}{4}$ lines."

Mesosternum narrower than the coxa; *first ventral segment* longer than the metasternum; *form* more slender than any other; *third joint of antennæ* one and a half times the second joint.

Sexual characters as in the preceding, which it closely resembles, except in the minute punctuation of the thorax.

Length 10 mm. : .40 inch. *Habitat*.—Mich., Pa.

Rare, only three specimens examined.

D. æqualis Say. Original description.

"Brassy, with two dilated indented subsutural spots on the elytra, and an indented humeral line; two elevated lines between the eyes. Inhabits Missouri.

"Body æneous, polished, punctured, glabrous; head with short cinereous pubescence, an obsolete indented line, two elevated tubercles between the eyes, extending in a depressed ridge to the base of the antennæ, where it is slightly more elevated; eyes black; antennæ clothed with cinereous pubescence, second and third joints equal; palpi and mandibles black; thorax densely punctured, punctures sometimes confluent, a longitudinal indented line, a lateral dilated, hardly elevated tubercle before the middle; scutell minutely punctured and rugulose; elytra with regular series of punctures, surface slightly rugulose; two subsutural dilated, obsolete, indented spots near the middle and a subhumeral impressed dilated line at base; beneath argenteous pruinose; feet cupreous, pubescent, a robust spine beneath the posterior thighs near the tip. Length rather less than 7—20 inch. Var. *a*. Body above cupreous, polished."

Mesosternum narrower than the coxa; *first ventral* longer than the metasternum; *elytral tip* truncate, the sutural margin near apex not sinuate, but polished impunctate; form short, moderately convex.

Male, pygidium truncate; *female*, slightly elongate, rounded at tip. The posterior femora are dentate in both sexes.

Length 5½–7 mm.; .22–.28 inch. *Habitat*.—Ga., D. C., Pa., N. Y., Ill., Iowa, Canada.

Dr. John Hamilton has advised me of the following facts regarding the habits of this species: "I have taken *æqualis* in April in a swampy meadow just thawing out. The insects were in the bunches of sedge and coarse grass, and must have been imbedded in ice most of the Winter, or under water much of the time. I take the same species in this swamp in July on the sedge, and with it I once took a few specimens of *subtilis*. This meadow is bottom ground between two hills."

D. tuberculata Lacordaire. Original description translated.

"Oblong, above æneo-cupreous shining, beneath cinereo-sericeous; abdomen, antennæ and legs rufescent. the femora broadly metallic green towards apex; prothorax subquadrate, narrowed at the base, anterior angles prominent, the sides strongly tuberculate anteriorly, the disc very convex, slightly closely rugose, with a deep dorsal channel, entire; elytra short, oblong, the apices declivous, separately rounded, above slightly depressed, evidently impressed, finely punctato striate, punctures aviculate, interstices flat, finely transversely rugose. Long. 2½ lines. Lat. 1½ lines."

Mesosternum nearly as broad as the coxa; *first ventral* about as long as the metasternum; *elytra* slightly dehiscent at tip, which is distinctly truncate, the impressed or indented spaces on the disc not deep as in the preceding, but barely evident; *antennæ* with third joint twice as long as second; femora differing in the sexes.

Male, pygidium truncate, emarginate at middle; posterior femora with an acute tooth. *Female*, pygidium elongate, rounded at tip, posterior femora usually unarmed, at most a feeble rudimentary tooth.

This species is usually quite rufous, tinged with metallic lustre, but varies to a darker color, nearly as cupreous as *subtilis*. It was found at Jamesburg, N. J., July 4, 1890, in large numbers on the *Sagittaria* in the cranberry bogs not mixed with any other species. It does not occur in this vicinity on the lilies or reeds, and I have no doubt the *Sagittaria* is its food-plant.

Length 5–8 mm.; .20–.32 inch. *Habitat*.—Mass., N. Y., N. J., D. C.

D. distincta LeConte. Original description translated.

"Cupreo-æneous; thorax punctate, quadrate, narrowed behind, angles prominent, the sides moderately tuberculate, channeled, apical and basal margins reflexed; elytra with flat interstices, depressed at the suture, bi-impressed, the sides gradually declivous, the apex less truncate (compared with *hirticollis*). Posterior femora strongly clavate, armed with an acute tooth. Long. .36. Lake Superior."

Mesosternum narrower than the coxa; *first ventral* longer than the metasternum; *elytral tip* subtruncate; form slightly convex, second and third joints of antennæ nearly equal, punctuation similar to *subtilis*, but finer.

Male, pygidium acutely emarginate at middle; *female*, simply rounded.

Length 7—9 mm.; .28—.36 inch. *Habitat*.—Mich., Wis., Mass.

The sutural margin of the elytra is slightly sinuate in this species for a short distance, not exceeding one-tenth the length, near the apex. It seems to be rare, and I cannot separate it with the specimens before me from *torosa* Lec. It would be hazardous, however, to unite them without a larger series for comparison.

Var. **torosa** LeConte. Original description translated.

"Slightly elongate, blackish violet, head strongly torose; thorax alutaceous, sparsely, finely punctate, somewhat elongate, narrowed behind, angles prominent, sides tuberculate, disc subcanaliculate; elytra scarcely triangular, apex rounded, truncate, the disc rugose, bi-impressed; posterior femora moderately clavate, armed with a moderately acute tooth. *Long*. .25. *Mass*."

Mesosternum, etc., as in *distincta*.

Length 6—7 mm.; .24—.25 inch. *Habitat*.—Mass., D. C., Ill., Iowa.

D. Harrisii LeConte. Original description translated.

"Elongate, eyes scarcely prominent, orbit absent; elytra convex, apex truncate, antennæ slender, the second joint shorter; æneous, head scarcely torose, thorax elongate, densely rugosely punctate, scarcely narrowed behind, angles prominent; slightly canaliculate impressed in front of the base, the lateral tubercle scarcely prominent, the basal impression well defined. Elytra parallel, obliquely narrowed towards the apex, strongly punctured in rows, finely rugose. Antennæ annulate, the second joint half as long as the others. *Long*. .42. *Pa*. Very rare.

"Male, posterior femora incrassate, armed with an acute tooth.

"Female, posterior femora feebly incrassate, mutic (not dentate).

"A singular species, the small eyes suggesting *Statira* of the *Lagriidæ*."

Mesosternum narrower than the coxa; *first ventral* about equal to the metasternum; *elytral tip* truncate.

Pygidium acutely emarginate male, rounded quite broadly female. The female pygidium appears to be emarginate in two specimens, being somewhat elevated at middle, probably by accident.

This is the only large species with the sinuate elytral suture.

Length 10—11 mm.; .40—.44 inch. *Habitat*.—Mass., Conn., N. Y.

D. pusilla Say. Original description.

"Green, elytra brassy, tibiæ and tarsi rufous, second and third joints of antennæ equal. Head brassy green, very densely and confluent punctured, a well impressed frontal line, lateral lines none, no appearance of frontal tubercles; antennæ short, much less than half the length of the body, second and third joints equal, fourth hardly longer, joints dull rufous, blackish at tip. Thorax green, tinged with brassy, longer than broad, as densely punctured as head, middle and anterior edge a little elevated, longitudinal line none, lateral tubercles obvious. Elytra brassy green, a little tinged with cupreous, with striæ of punctures, three longitudinal indentations near the suture, of which the anterior one is widest and deepest, with a slight impressed line extending obliquely to the base, tip decurved and rounded. Beneath green, tinged with brassy, feet rufous, thighs at tip brassy green, posterior pair with a prominent angle beneath. *Length* rather more than $\frac{1}{4}$ inch."

This species has been known as *cuprea* Kirby, from which it does not differ. I subjoin Kirby's description also:

"Above copper colored, glossy underneath with a thick coat of cinereous pile; antennæ black, legs obscurely rufous, posterior thighs unidentate, prothorax subtransverse. Length of body $4\frac{1}{2}$ lines. Taken in Canada by Dr. Bigsby. . . . Head downy channeled, mouth and palpi rufous, mandibles and antennæ black; prothorax rather wider than long, very minutely, thickly and confluent punctured and wrinkled, channeled with a pair of impressions on each side, anterior tubercles not prominent, scutellum downy; elytra very glossy, punctured in rows, a single anterior impression near the suture, truncated at the apex; three intermediate segments of the abdomen have a yellow margin; legs obscurely rufous, thighs bronzed in the middle, posterior thighs with a minute tooth near the apex."

Mesosternum narrower than the coxa; *first ventral* shorter than the metasternum; *elytral tip* rounded, not truncate, as described above. It is very little rounded, but compared with *subtilis* it is seen to be distinctly rounded. Sutural margin sinuate near the apex, the sinuation filled with a glittering impunctate plate; form convex, thorax depressed, third and second joints of antennæ subequal.

Male, pygidium truncate and slightly arcuately emarginate.

Female, pygidium more elongate, rounded; tooth of posterior femora smaller. The sexes of *cupreu* are not readily distinguished.

The color varies from bright reddish or cupreous, through many shades of metallic color, to a form nearly black. The legs are yellow or rufous in the majority of specimens; in a few they are nearly black, and constitute the variety *pyritosa* Lec.

The relative length of the antennal joints is not constant, and will not serve to separate *pyritosa*, as a species, as stated by Mr. Crotch. From some variation observed in the specimens before me, I am doubtful if it is a sufficiently defined variety even to be continued in the list.

The indentations of the elytra are somewhat variable in depth and consequent distinctness, but are never very marked. The species is sometimes mixed in collections with *æqualis* Say, and the depth of these indentations afford a convenient index for their separation.

Length 6—8 mm.; .24—.32 inch. *Habitat*.—Hud. Bay Terr., Can., Van., Wash., Oreg., Cal., Idaho, Mont., Wis., Mich., Col. A few of the numerous specimens are labeled Mass., N. Y. and N. J., and are perhaps correct, but the species appears to be more abundant in the North and West.

D. femoralis Kirby. Original description.

"Body bronzed, gilded with a greenish tint, very minutely and thickly punctured, not conspicuously hairy underneath. Frontal channel slight; antennæ, except the scape, which is bronzed, and mouth rufous; prothorax with an impression above the scutellum, anterior tubercles more than usually prominent, scutel rather large. Elytra with single slight anterior impression adjoining the suture; legs rufous, but the thighs, which are much incrassated, except the base and summit are green bronzed, posterior thigh without any tooth. Abdomen as in the preceding species, yellow. This species seems nearly related to *pusilla*." The posterior thighs are dentate in male, and the above description was made from a single female specimen.

Mesosternum, etc., as in preceding, also the sexual characters, except the posterior femora. It is but feebly differentiated from *cuprea*, and is rare in collections.

Length 8 mm.; .32 inch. *Habitat*.—Wash., Vanc.

D. emarginata Kirby. Original description.

"Body dark blue, clothed underneath with pile, in certain lights glittering like silver. Antennæ black, tubercles of the prothorax prominent. Elytra with an impression near the suture, last dorsal segment of the abdomen emarginate, thighs very thick, bronzed, posterior one with a stout tooth. This species comes very near *sericea*, but it is sufficiently distinguished by the deeply notched podex, the silver pile that clothes its body underneath, which in that species has a golden lustre."

Mesosternum narrower than the coxa; *first ventral segment* shorter than the metasternum; *elytra* rounded at tip, the sutural margin strongly sinuate near the apex; *form* convex, moderately elongate, second and third *antennal joints* nearly equal.

Male. pygidium acutely emarginate. *Female*, pygidium elongate, scarcely rounded. Posterior femora dentate in both sexes.

Varies but little from the dark metallic blue described by Kirby, but occasional specimens are nearly black.

Length 6—7 mm., .24—.28 inch. *Habitat*.—Vanc., Can., Cal., Wash., Col., Neb., Pa., Mass., N. H. Abundant.

D. metallica Ahrens. Dr. LeConte's description translated.

"Elytra subparallel, apex subtruncate or rounded, second and third antennal joints subequal, posterior femora but little elongate. Thorax narrowed behind, eyes with the orbits not produced. Elytra rather convex, parallel; apex rounded or feebly truncate, posterior femora armed with a tooth. Thorax rather elongate, less convex. Legs short, posterior femora moderately clavate, attenuate at base; form subelongate, shining. Head not torose, thorax rugulose, the disc smooth on each side, somewhat narrowed behind regularly, anterior angles prominent, lateral tubercles scarcely prominent, a deep impressed transverse channel before the base. Elytra rugose. Long. .23—.26. Pa."

"Male, antennæ longer, femoral tooth distinct. Female, antennæ shorter, femoral tooth obsolete. Varies metallic golden, green and blackish, also more or less rufous."

Mesosternum, etc., as in the preceding. *Pygidium*, truncate male, elongate and rounded female. The difference is not, however, strongly marked.

Length 5½—7 mm.; .22—.28 inch. *Habitat*.—N. H., Mass., Pa., Md., N. C., Fla., Ill. Abundant.

D. flavipes Kirby. Original description.

"Body bronzed copper with a golden lustre, clothed below with very short, somewhat silvery, decumbent hairs, the metallic splendor of the body being visible through them. Head thickly, minutely and confluent punctured or wrinkled, channeled between the eyes; antennæ testaceous, longer than the prothorax; prothorax subquadangular, longer than usual in the genus, widely channeled, very minutely, thickly and confluent punctured and wrinkled, anterior tubercles large and not prominent. Elytra with two impressions adjoining the suture, elevated at the base; legs testaceous. Latitude 65."

Mesosternum narrower than the coxa; *first ventral segment* shorter than the metasternum; *elytra* rounded at apex, the sutural margin distinctly sinuate near

the apex; *form* convex, second and third *antennal joints* subequal; *posterior femora* dentate in both sexes.

Male, pygidium distinctly truncate. *Female*, pygidium rounded.

Varies from typical bronze color to a dark blue; it also varies in the depth of the thoracic grooves or channels.

Length 7—9 mm.; .28—.36 inch. *Habitat*—Mass., N. Y., Pa., Ill., Kan., Can., Mich. About thirty specimens examined.

D. rufa Say. Original description.

"Dull metallic rufous, front destitute of lateral impressed lines. Body totally dull rufous with a metallic gloss, particularly on the elytra. Head dusky, almost opaque, with much crowded, very small punctures, no appearance of tubercles, a very distinct impressed frontal line extending down between the antennæ, no appearance of impressed lines near the eyes; antennæ somewhat paler than the body, third joint longer than second; thorax longer than broad, minutely punctured, longitudinal line very distinct, a transverse impressed line on the posterior submargin, lateral tubercles rather prominent, obtuse, tubercle of the anterior angle distinct from the large tubercle, acute, elytra hardly obviously unequal near the suture, with striæ of punctures, tip decurved, almost truncated, or obtusely rounded; beneath, in a particular light, dull silvery sericeous, feet rufous. Length more than 3-16 inch."

With this species must be united *Kirbyi* Lac., described as follows:

"Thorax convex, legs short and stout, posterior femora elliptical, armed beneath with a strong tooth, not attenuate at base. Subelongate, cupreo-æneous, shining; thorax sparsely punctate cordate, angles rounded, lateral tubercles distinct, but barely prominent, a slight channel before the base strongly impressed; elytra scarcely rugose, interstices flat, impressed before the middle; legs and antennæ rufous, third joint half as long again as the second, the fourth a little shorter. Long. .28. Ga. Varies with the thoracic tubercle less distinct."

Mesosternum, etc., as in the preceding, and the sexual characters are the same. No variations are observed in color, and the insect is readily known by the convex shining thorax almost destitute of punctuation.

Length 7—7½ mm.; .28—.30 inch. *Habitat*—Can., N. H., Mass., N. Y., Ohio, and one specimen is labeled "Texas."

Apparently more rare, the collections examined containing together sixteen specimens.

Synonymy and Bibliography.

The greater part of the following synonymy is derived from the "Catalogus" of Gemminger and Harold, from Dr. LeConte's Synopsis, or from Mr. Crotch's paper. Of the remainder a part is due to comparisons made by Dr. Horn with the LeConte types at Cambridge, and the balance is the result of a comparison of the published descriptions. All the older names have been recognized, and in some instances those which have been in use have had to give way to them.

- D. hirticollis* Kirby, 1837, Faun. Bor. Am. iv, p. 226; Lec., 1851, Proc. Ac. Phil. v, p. 313; *rudicollis* Lacord., 1845, "Monographie," Mem. Soc. Liege, iii, p. 108.
- D. pubicollis* Suffrian, 1872, Stett. Zeit. p. 21; Cr. 1873, Proc. Ac. Phil. p. 21.
- D. pubescens* Lec. 1867, Trans. Am. Ent. Soc. ii, 55.
- D. floridæ* n. sp.
- D. cincticornis* Newman, 1838, Ent. Mag. v, p. 391; Lac., l. c.; *lucida* Lac., l. c.; Lec., 1851, Proc. Ac. Phil. v, p. 310; *rufipennis* Lac., l. c.; *pulchella* Lec., l. c.
- Var. *proxima* Kirby, 1837, l. c.; Lec., l. c.; *episcopalis* Lac., l. c.; *quadricollis* var. Say, 1827, Journ. Ac. Phil. v, p. 282; *californica* Lec., Proc. Ac. Phil. 1861, p. 357.
- Var. *magnifica* Lec., Agass. Lake Sup., 1850, p. 236; Proc. Ac. Phil. 1851, p. 310.
- D. palmata* Olivier, Ent. 1795, iv, 75, p. 8, t. 1, fig. 7 a-c; Lac., l. c.; Lec., l. c.; *claudicans* Germ., Mag. Ent. iv, 1821, p. 173; *militaris* Lac., l. c.; *assimilis* Lac., l. c.; *vicina* Lac., l. c.; *cærulea* Oliv., l. c. (all females).
- D. hypoleuca* Lac., l. c., 1845; Lec., l. c.; *texana* Cr., l. c.
- Var. *rufescens* Lac., 1845, l. c.; Lec., l. c.
- D. piscatrix* Lac., 1845, l. c.; Lec., l. c.; *congener* Lec., l. c.; *alutacea* Lec., l. c.; *carolina* (male) Lac., l. c.; Suff., l. c.
- D. subtilis* Kunze, 1818, Mon. Neu. Schrift. Ges. Halle, ii, 4, p. 14; Lac., l. c.; Lec., l. c.; Suff., l. c.; *ænea* Ahrens, 1810, Neu. Schrift. Ges. Halle, i, 3, p. 21; *confluens* Lec., l. c.; *confluens* Say, l. c.; *fulgens* Lec., l. c.; Agass., Lake Sup. p. 236; *quadricollis* Say, l. c.; *ærea* Lac., l. c.
- Var. *rugosa* Lec., l. c.
- D. porosicollis* Lac., 1845, l. c.; Lec., Proc. 1851, p. 312.
- D. æqualis* Say, 1823, Jour. Ac. Phil. iii, p. 428; Suff., l. c.; *confusa* Lac., l. c.; Lec., Agass. Lake Sup.; *geniculata* Germ., i, litt; *pallipes* Lac., l. c.
- D. tuberculata* Lac., 1845, l. c.; Lec., Proc. 1851; *rutila* Mels., 1846, Proc. Ac. Phil. iii, p. 159.
- D. distincta* Lec., 1850, Agass. L. Sup. p. 236; Proc. 1851; *æqualis* † Kirby, l. c.
- Var. *torosa* Lec., 1851, l. c.
- D. Harrisii* Lec., 1851, l. c.; *inermis* Harris mss.
- D. pusilla* Say, 1823, l. c.; Lec., l. c.; *cuprea* Kirby, 1837, l. c.; Lec., l. c.; *aurifera* Lec., l. c.; (also Agass. L. Sup.) *dives* Lec. l. c.; *cataractæ* Newn., l. c.; *fulvipes* Lac., l. c.
- Var. *pyritosa* Lec., Rep. Surv. Pac. ix, 1857, p. 66.
- D. femoralis* Kirby, 1837, l. c.; Lec., Proc. 1851, p. 315; *Germari* Mann., Bull. Mosc. 1843, ii, p. 306; 1852, p. 368; Lac., l. c.; Esch., Dej. Cat.; *indica* Mels., l. c.; *flavipennis* Mann., l. c.; Lac. l. c.
- D. emarginata* Kirby, 1837, l. c.; Lac., l. c.; Lec., l. c.; *rugifrons* Newn., 1838, l. c.; *aurichalcea* Mels., *bimpressa* Mels., l. c.; *junci* Coup.
- D. metallica* Ahrens, 1810, l. c.; Kunze, l. c.; Lac, l. c.; Lec., l. c.; *gentilis* Lec., l. c.; *nana* Mels., l. c.
- D. flavipes* Kirby, 1837, l. c.; Lec., l. c.; *jucunda* Lec., l. c. (also Agass. Lake Sup.); *chalcea* Lac., l. c.; *parva* Lac., l. c.; *binodosa* Germ., Lac. l. c.
- D. rufa* Say, 1827, Journ. Ac. Phil. v, p. 283; *metallica* ‖ Say 1823, l. c.; *Kirbyi* Lac., 1845, l. c.; *affinis* ‖ Kby., l. c.; *sulcicollis* Lac., l. c.
- D. dentata* Fab., is a European insect, and the name should be dropped.